

RR13.**Comparison of Percutaneous Versus Open Repair of Femoral Arteries During Aortic Endovascular Aortic Repair**

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Objectives: Purpose: to compare the safety of percutaneous access (PA) to open repair (OR) of the femoral artery during endovascular aortic repair (EVAR and TEVAR).

Methods: Methods: A prospective nonrandomized study was performed between January 2006 and November 2009. Parameters of patients who underwent endovascular aortic repairs with either open femoral repair or percutaneous closure system (Preclose-proglide or Prostar technique) were collected in a dedicated database. Each patient underwent CT angiography preoperatively and postoperatively at 1 and 12 months. Patient variables (Age, gender, subcutaneous tissue depth, femoral artery diameter, type of calcifications, type of closure device, and size of sheath) were compared by using Chi-square, Fisher exact test, and paired and independent samples t tests when appropriate.

Results: Results: Among 405 patients who underwent endovascular aortic repair, we performed 185 OR (EVAR-160, TEVAR-25) and 220 PA (EVAR-206, TEVAR-14). Immediate conversion from PA to OR was necessary in 34 patients (15.6%), and was significantly more frequent in patients with a femoral artery diameter $<10\text{mm}$ (76.5% vs 4.6%; $p = 0.006$). No significant difference was observed between the 2 groups regarding the length of in-hospital stay, the rate of postoperative infections and of late complications (7.4% in the PA group vs 4.3% in the OR group). The type of closure device, the size of the sheath did not significantly influence the outcome. However, late complications in PA group only occurred on the side of the larger sheath.

Conclusions: Conclusions: In our study, PA carries a higher risk of complications than OR. PA is a safe technique in patients with a femoral artery diameter $> 10\text{ mm}$ (4.6% immediate conversion) but it did not decrease the length of stay nor the postoperative complication rate.

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RR14.**In Vivo Displacement Force (DF) Is Higher in Patients Who Experience Aortic Endograft Migration: A 3D Computational Analysis**

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Objectives: Current aortic endografts are designed to resist downstream displacement. Nonetheless, migration may occur during long-term follow-up due to the pulsatile action of blood flow. We performed patient-specific computational analysis of the 3D displacement forces (DF) acting on abdominal endografts implanted in 16 patients.

Methods: We have developed computational fluid dynamics (CFD) techniques to quantitate the DF acting on aortic endografts. Patient-specific computational models were constructed in 16 patients using early ($<30\text{day}$) post-EVAR cardiac-gated CT and phase-contrast magnetic resonance imaging scans. Late migration occurred in 7 patients (each required secondary intervention at 1-8 years) and 9 patients had no migration documented with follow-up imaging for 5-10 years.

Results: Migration patients were similar in age and comorbidities, but had larger aneurysms than non-migration patients ($65.1 \pm 12.4\text{ mm}$ vs $49.8 \pm 6.5\text{ mm}$). DF varied in orientation and magnitude for each patient and was greatly influenced by aneurysm and iliac angulation and tortuosity as well as the individual patient hemodynamic state. The magnitude of DF for all patients was $4.03 \pm 1.85\text{ Newtons (N)}$, range 2.05N - 9.51N. The magnitude of DF for migration patients ($5.08 \pm 2.24\text{ N}$) was significantly greater than in non-migration patients ($3.22 \pm 0.98\text{ N}$, $p < 0.05$). The orientation of DF was primarily perpendicular to the greatest curvature of the endograft, rather than in the downstream direction of blood flow.

Conclusions: Pulsatile DF acting on aortic endografts is significantly greater in magnitude in patients who experience late endograft migration. Late endograft migration may be the result of continuous long-term exposure to sideways oriented DF together with aneurysm size, curvature and tortuosity considered in balance with the fixation forces of the endograft. Calculation of postoperative endograft DF may be a useful factor to understand the likelihood of endograft migration.

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RR15.**Outcomes of Carotid Artery Stenting Versus Historical Surgical Controls in Patients With Radiation-Induced Carotid Stenosis, With or Without Prior Neck Dissection**

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